

center spacing between each pad of the first set and the adjacent pad or pads of the first set, and at least a second predetermined center-to-center spacing, less than said first spacing, between each pad of the second set and the adjacent pad or pads of the first and second sets, and a passivation layer exposing only pads of the first set, or exposing only pads of the first and second sets.

REMARKS/ARGUMENTS

The Applicant has carefully considered this application in connection with the Examiner's Action and respectfully requests reconsideration of this application in view of the foregoing amendment and the following remarks.

The Applicant originally submitted Claims 1-10 in the application, and subsequently added Claims 11 and 12. The Applicant presently amends Claim 1 merely for clarification and without adding new claimed subject matter. The Applicant does not presently cancel or add any claims. Accordingly, Claims 1-12 are currently pending in the application.

The Applicant acknowledges the Examiner's indication that Claims 11 and 12 are allowed, and that Claims 5 and 6 would be allowable if rewritten in independent form including all of the limitations of the base claims and any intervening claims.

I. Rejection of Claims 1-4 and 7-10 under 35 U.S.C. §102

The Examiner has maintained a rejection of Claims 1-4 and 7-10 under 35 U.S.C. §102(e) as being anticipated by U.S. Patent No. 6,265,783 to Juso, *et al.* ("Juso"). However, Juso fails to disclose a passivation layer that exposes only pads of a first set of conductive pads, or only pads of first and second sets of conductive pads, as recited in Claim 1 of the present application. In contrast,

Juso discloses an insulating substrate 5 having through-holes 9 that expose underlying lands 10, dummy lands 11, a solder resist film 7 and an adhesive film 8, in order to release moisture through the insulating substrate 5 during a reflow process and thereby prevent the semiconductor device 1 from swelling. (Fig. 1; column 5, lines 35-43). Because the insulating substrate 5 exposes the solder resist film 7 and the adhesive film 8, the insulating substrate 5 exposes more than the lands 10 and dummy lands 11. Accordingly, Juso fails to anticipate the invention recited in Claim 1.

Moreover, because Juso explicitly provides openings in the insulating substrate 5 in order to release moisture during a reflow process to prevent the semiconductor device 1 from swelling, the insulating substrate 5 cannot be a passivation layer. However, the Examiner has maintained an assertion that the insulating substrate 5 functions as a protective or passivation layer. (Examiner's Action, pages 5-6). The Applicant maintains that an insulating substrate (*e.g.*, the insulation substrate 5 in Juso) cannot function as a passivation layer if it includes holes through which moisture may travel to or from passivated regions. Those skilled in the art understand that a passivation layer is employed to passivate (*i.e.*, seal and otherwise prevent contamination or corrosion) a device or region thereof. Accordingly, the Applicant maintains that the insulating substrate 5 is not a passivation layer, and Juso fails to disclose a passivation as recited in Claims 1 and 11 of the present application.

Furthermore, Juso fails to disclose a first predetermined center-to-center spacing between each pad of the first set and the adjacent pad or pads of the first set, and a second predetermined center-to-center spacing, less than the first spacing, between each pad of the second set and the adjacent pad or pads of the first and second sets, as recited in Claim 1. Juso also fails to disclose a first set of conductive pads having a first minimum distance therebetween, and a second set of

conductive pads having a second minimum distance therebetween, and between a pad of the second set and a neighboring pad of the first set, as recited in Claim 8. In contrast, every land 10 and dummy land 11 disclosed in Juso is equidistant from adjacent pads. (FIGs. 2 and 4, *e.g.*). Because each land 10 and dummy land 11 is equidistant from an adjacent land 10 or dummy land 11, Juso fails to disclose sets of pads having first and second predetermined center-to-center spacings and first and second minimum distances therebetween.

Therefore, because Juso fails to disclose each and every element of Claims 1 and 8, Juso is not an anticipating reference for Claims 1 and 8. Because Claims 2-4, 7, 9 and 10 are dependent upon Claims 1 and 8, Juso also cannot be an anticipating reference for Claims 2-4, 7, 9 and 10. Accordingly, the Applicant respectfully requests the Examiner to withdraw the §102 rejection with respect to Claims 1-4 and 7-10.

II. Rejection of Claims 1-3 and 8-10 under 35 U.S.C. §102

The Examiner has maintained a rejection of Claims 1-3 and 8-10 under 35 U.S.C. §102(b) as being anticipated by U.S. Patent No. 5,641,946 to Shim. However, Shim fails to disclose a passivation layer that exposes only pads of a first set of conductive pads, or only pads of first and second sets of conductive pads, as recited in Claim 1 of the present application. In contrast, Shim discloses an insulating layer 6 that exposes more than pads of only a first set of conductive pads, or more than pads of first and second sets of pads. Specifically, Shim discloses that the insulating layer 6 exposes pads of three or four sets of conductive pads of respective heights h_1 , h_2 , h_3 and H . (FIGs. 11 and 14).

Shim also fails to disclose that the center-to-center spacing of each set of pads differs between different sets of pads, as recited in Claim 1. Similarly, Shim also fails to disclose a first set of conductive pads having a first minimum distance therebetween, and a second set of conductive pads having a second minimum distance therebetween, and between a pad of the second set and a neighboring pad of the first set, as recited in Claim 8. In contrast, as clearly shown in FIGs. 5-14, Shim discloses that each solder ball 3 and land 5 are equidistant from adjacent solder balls 3 and lands 5. Because the solder balls 3 and lands 5 are equidistant from all adjacent balls 3 and lands 5, they have the same center-to-center spacing, rather than different center-to-center spacing. Similarly because the solder balls 3 and lands 5 are equidistant from all adjacent balls 3 and lands 5, there is only a single minimum distance therebetween, rather than first and second minimum distances.

In contrast, the Examiner has asserted that if the spacing between the outermost lands 5 is defined as the first spacing of the first set, and the spacing between the innermost lands 5 is defined as the second spacing of the second set, then the spacing of the second set is clearly less than the first spacing of the first set because the innermost lands 5 are formed in the boundary of the outermost lands 5. (Examiner's Action, page 6). However, the Applicant believes the Examiner has inadvertently misinterpreted the claims of the present application. Specifically, Claim 1 recites a first predetermined center-to-center spacing between each pad of the first set and the adjacent pad or pads of the first set, and at least a second predetermined center-to-center spacing between each pad of the second set and the adjacent pad or pads of the first and second sets (Claim 8 contains a similar recitation). According to such a recitation, the center-to-center spacing is measured between each pad and an adjacent pad or pads. However, as clearly shown in FIGs. 9A and 11 of Juso, all

of the lands 5 and solder balls 3 of equal size are equidistant from adjacent lands 5 or solder balls 3 of the same or different size. Thus, the outermost lands 5 have the same center-to-center spacing as the innermost lands 5. Accordingly, Shim fails to disclose that the center-to-center spacing of each set of pads differs between different sets of pads, as recited in Claim 1, and as similarly recited in Claim 8.

Accordingly, because Shim fails to disclose each and every element of Claims 1 and 8, Shim is not an anticipating reference for Claims 1 and 8. Because Claims 2, 3, 9 and 10 are dependent upon Claims 1 and 8, Shim also cannot be an anticipating reference for Claims 2, 3, 9 and 10. Accordingly, the Applicant respectfully requests the Examiner to withdraw the §102 rejection with respect to Claims 1-3 and 8-10.

III. Rejection of Claim 7 under 35 U.S.C. §103

The Examiner has rejected Claim 7 under 35 U.S.C. §103(a) as being unpatentable over Shim. However, as discussed above, Shim fails to teach a passivation layer that exposes only pads of a first set of conductive pads, or pads of first and second sets of conductive pads, as recited in Claim 1 of the present application. Moreover, Shim fails to suggest such a passivation layer. In contrast, Shim teaches a passivation layer that exposes three or four sets of conductive pads, as discussed above.

Shim also fails to teach sets of conductive pads having different predetermined center-to-center spacing, as also discussed above. Moreover, Shim fails to suggest such conductive pads. In contrast, Shim merely teaches that all solder balls 3 and lands 5 are equidistant from adjacent solder balls 3 and lands 5, such that there are no sets of pads discernible by center-to-center spacing.

Accordingly, Shim fails to teach or suggest each and every element of Claim 1 of the present application. Therefore, Shim fails to support a *prima facie* case of obviousness with respect to Claim 1 and its dependent Claims. Because Claim 7 is dependent upon Claim 1, Shim also fails to support a *prima facie* case of obviousness with respect to Claim 7. Accordingly, the Applicant requests the Examiner to withdraw the §103 rejection with respect to Claim 7.

IV. Allowable Subject Matter

The Applicant acknowledges the Examiner's indication that Claims 5 and 6 would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. (Examiner's Action, page 5). However, as discussed above, the Applicant believes Claim 1 is in a condition for allowance. Accordingly, because Claims 5 and 6 are dependent upon Claim 1, the Applicant believes Claims 5 and 6 are in a condition for allowance without the Examiner's suggested amendments. Therefore, the Applicant requests the Examiner withdraw the objection to Claims 5 and 6.

V. Conclusion

In view of the foregoing amendment and remarks, the Applicant now sees all of the Claims currently pending in this application to be in condition for allowance and therefore earnestly solicit a Notice of Allowance for Claims 1-12.

Attached hereto is a marked-up version of the changes made to the claims by the current amendment. The attached page is captioned "**Version with markings to show changes made.**"

The Applicant requests the Examiner to telephone the undersigned attorney of record at (972) 480-8800 if such would further or expedite the prosecution of the present application.

Respectfully submitted,

HITT GAINES & BOISBRUN, P.C.

A handwritten signature in black ink, appearing to read "Charles W. Gaines". The signature is fluid and cursive, with the first name "Charles" being more prominent.

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VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE CLAIMS:

(1) Please amend Claim 1 as follows:

1. (Twice Amended) An integrated circuit die including first and second sets of conductive pads for enabling external connections to be made to the integrated circuit, wherein each pad of said first set is larger than each pad of said second set, there being at least a first predetermined center-to-center spacing between each pad of the first set and the adjacent pad or pads of the first set, and at least a second predetermined center-to-center spacing, less than said first spacing, between each pad of the second set and the adjacent pad or pads of the first and second sets, and a passivation layer exposing only pads of the first set, or exposing only pads of the first and second sets.